STAR MAZDA SETUP GUIDE

by Mark Ursel
with Bruce Funderburg

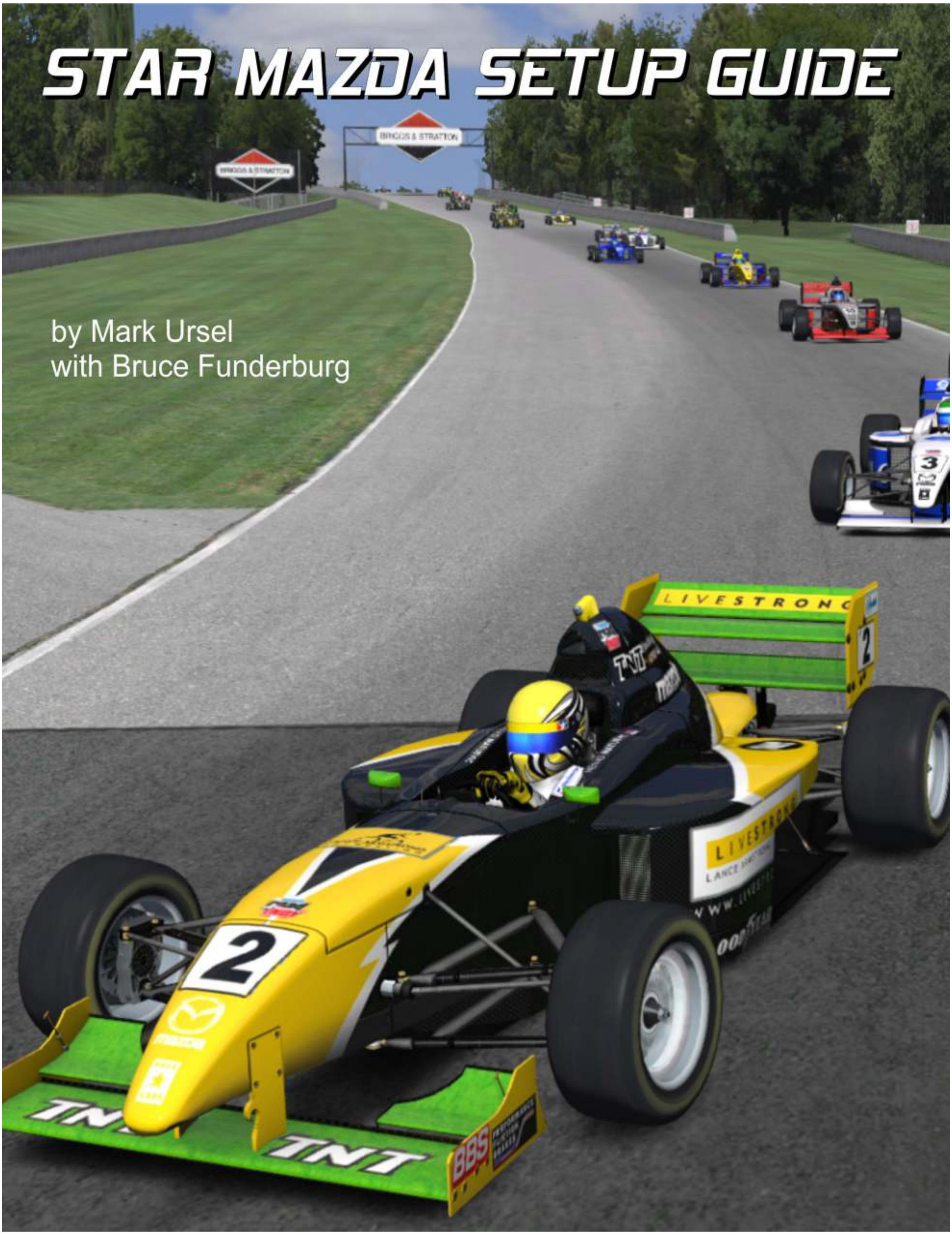


Table of Contents

Introduction

Setting up a Star Mazda is a bit of science and a bit of art. This guide will address the science part – the art is in your hands!

Most guides are structured so that they will show you each setting that's available and describe it in detail. This guide does that.

What is also included is some help in how to break down the sections of a track to isolate what settings help and why.

At the end there's a troubleshooting guide to try to help you quickly make changes depending on what the problem is.

Analyzing Your Driving

Each race track has a number of individual zones that require consideration when creating or modifying a setup. From hard braking zones leading into a hairpin or chicane to sweeping corners leading onto long straights, each zone will have an impact on how you set up the car.

It's very important to learn to analyze what is happening when you're turning laps. Coming back into the pits with the impression that the car is loose is just not good enough – you have to know *when* it's loose. At what part of the corner - entry? mid-corner? exit?

The adjustments available in the car can address these individually, so you have to pay attention to where the slides are happening.

The same thing applies to understeer. You have to pinpoint exactly what part of the the corner the car is pushing through. It's possible to have a car that pushes on turn-in, glides nicely in mid-corner, then wants to swap ends when you put the hammer down.

The driver also has a significant influence on the handling of the car. Being rough and abrupt with your inputs can often disguise the actual effects setup changes are causing. Smoother driving certainly makes for easier and more reliable analysis. Keep in mind that in some cases, the cure to the car's handling might be a better line through the corner rather than a setup change.

With that in mind, let's start the process!

Creating A Setup

Start with a stable baseline setup suitable to the track (iRacing's high- medium- and low-downforce setups are as good a starting point as any). Another excellent source is the iRacing Star Mazda forum where many top drivers post setups for everyone to try. Once you've chosen a baseline setup, use this section to help you make adjustments.

If you follow this setup technique in order, you'll find that creating a setup from scratch is not as hard or time consuming as you think.

Baseline Setup

Choosing a baseline setup is dependent on the track.

At tracks with short straights and many corners (Silverstone, Laguna Seca, Mid-Ohio, Oulton Park), you want a high-downforce baseline.

For longer tracks with long straights (Spa-Francorchamps, Road America), you want a low-downforce baseline setup.

For shorter tracks with long straights (Road Atlanta, Phillip Island) or longer tracks with lengthy technical sections (Suzuka) you want a medium-downforce baseline.

Tracks come in many shapes & sizes, so experiment and see which baseline works best for you.

Straightaway Speed

Major adjustment: Wings, Gearing Minor

adjustment: Ride Heights

Wing angles directly impact the amount of aerodynamic drag the car produces. Higher wing angles mean more drag. ~~The Star Mazda's wings can be adjusted from 13 degrees to 34 degrees, so a setup using 13F and 13R will produce the lowest amount of drag, and highest straightaway speeds.~~ Taller Gurney flaps (or wickerbills) also cause more drag.

“Rake” also adds drag. If the front ride height is significantly lower than the rear it can take 1 or 2mph off your top speed.

Set the gear set so you maximize the top speed of the car on the fastest straight. This is achieved by setting it so that the car is just under the rev limiter. The idea is to use as short of a gear as you can to maximize acceleration while not limiting the top speed by hitting the rev limiter. ~~The 5th gear in the tall Star Mazda gear set is just a hair taller than the 6th (top) gear in the short gear set. So if you are never shifting out of 5th with the tall gear set, try using the short gears, and conversely, if you are hitting the redline in 6th with the short gears you need to switch to the tall gear set.~~

In short, to maximize straightaway speed, have low-angled wings and a level car.

Advice: For the fastest straight-line setup, try ~~13F/13R for the wings, tall gears~~ low wing angles with no Gurneys and level ride heights. For maximum grip, try ~~31F/34R wings with .150in (4mm) rake and short gears~~ increased wing angles, full Gurneys, and more chassis rake. Note that with the current aero & car model, lower drag settings seem to produce the best results (A2 or less rear wing flap setting).

Corner Entry

Major Adjustments: Front Brake Bias, Front Springs, Front ARB

Minor Adjustments: Front Bumps, Rear Rebounds, Rear Springs, Rear ARB, Front Toe

Corner-entry is when you are braking for a corner through the initial turn-in. The act of braking dramatically shifts the car's weight from the middle to the front, placing far more load on the front tires & suspension while at the same time releasing load from the rear tires and suspension. What gives more grip to the turn-in is to slow down and smooth out that weight shift.

The **front brake bias** is probably the easiest setting to understand and appreciate the effects of. If the car is snap-spinning on entry it's because the rear tires are losing grip in a hurry. As the rears lose weight, it's very easy to lock the rear brakes and snap the car around. In this case, move the brake bias forward until those lockups go away. If the car is just plowing straight ahead and doesn't want to turn at all, the fronts are probably locking up, so move the brake bias more towards the rear.

Front springs have a large effect here. The stronger the front spring, the ~~the~~ more load is on the front tires, and the faster the tires will **lose** compliance. Too soft and you'll get good grip, but the steering response gets “mushy”. Too soft also leads to bottoming as the springs compress too easily and allow the bottom of the car to hit the road. If the car wants to spin, strengthen the front spring. If it doesn't want to turn, soften the front spring.

The **front anti-roll bar** has a major effect here as the car begins to turn. As the car turns, the cornering forces cause the chassis to lean, or roll, toward the outside of the corner. The amount of chassis roll needs to be limited in order to keep side-to-side tire loading and the camber of the tires in the optimal range. The front ARB controls how that happens and how much body-roll there is. More body-roll (soft ~~no~~ ARB) generally equals more grip, but the price ~~is~~ can be mushy, indistinct steering. Less body roll (firm ARB) equals less grip, but fast, or even twitchy steering. Stiff anti-roll bars can also lead to increased inside tire lockup under braking.

Front bumps and **rear rebounds** work hand-in-hand to control how fast the weight shift gets to the front tires. Front bumps control how fast the front suspension accepts weight, while the rear rebounds control how fast the rear gives up weight. If you picture a see-saw, the bumps are slowing one side from going down while the rebounds are slowing the other side from going up. Stiff front bumps and soft rear rebounds let the weight transfer happen very quickly, leading to understeer. Conversely, soft front bumps and stiff rear rebounds will maintain front grip longer leading to oversteer. Low speed adjustments are the ones that impact how the chassis rolls, squats, and dives (i.e. handles). High speed adjustments (referring to the shocks piston speed, not the cars speed) impact how the car behaves over bumps.

The **rear springs** and **rear anti-roll bar** are a less important adjustment for the turn in phase of cornering because most of the load and work in being done at the front end of the car during this stage. However, they still have an effect, but in an opposite direction to the front adjustment. So while you would stiffen the front springs and/or ARB to reduce oversteer, at the rear you would soften them to do the same thing.

Increasing **front toe-out** (or negative values) will speed up the car's response to the initial turn of the wheel at corner-entry. The tradeoff can be a loss of straight-line speed and stability. Conversely, using more toe in (positive values) can make the car more stable on entry. Zero toe gives the least rolling resistance and is a good starting point for high speed tracks. ~~A little toe goes a long way so don't go crazy.~~ [lots of toes sometimes works in the sim]

Advice: Brake bias, front springs and front ARB aren't likely to change too much from one set to the next, so once you've found a good baseline setup for the track, concentrate on fine-tuning with the damper adjustments.

Mid-Corner

Major Adjustment: Wings, Springs, ARBs

Minor Adjustment: Ride Heights

"Mid-Corner" is where you have come off the brake but have not yet gone fully back on the throttle. The behavior here is dependent mostly on aerodynamics, with small effects felt from the suspension. It's most apparent on higher-speed sweepers, long "carousels" or hairpin corners. This is where you spend the most time mid corner. In a standard 90 degree corner you transition very fast from entry to exit, with little time spent in the mid-corner phase.

Wings have a major effect, and what we're talking about is the aero balance. T1 at Silverstone or Road America really demonstrate it well. If you have too little front wing or too much rear wing, it's very difficult to keep the car from running off the track. Too much front wing or too little rear wing, and you're fighting a spin the whole way around the corner. Make very small adjustments to try to get the right balance through sweeping corners. In hairpins and other slow corners the wings have less ~~little~~ effect in mid-corner.

Ride heights fine-tune the aerodynamics. For more aero understeer (or less oversteer), raise the rear or lower the front (thus increasing the rake). [old statement was reversed, raising the rear tends to increase the rear downforce leading to more understeer, but the mechanical grip works the opposite way as stated below (but admittedly the aero effects can be very complicated, and very a lot depending on the car & conditions)] Do the reverse to dial out oversteer. Note that this is the opposite effect of the same adjustments to the mechanical grip. Which is why WHERE you are experiencing oversteer or understeer is so important to how you go about fixing it. Higher ride heights generally reduce the downforce produced by the underbody and diffuser, but go too low and you start choking the underbody flow, reducing downforce. Try to avoid a nose up rake under dynamic conditions (Google "Road Atlanta blow over" to see why).

Springs and **ARBs** also have an effect on mid corner behavior. Stiffer springs or ARBs will reduce grip on that end of the car while softer springs will increase grip. The is especially evident in hairpins and other slow corners where downforce has little effect.

Advice: Finding the gross balance with the wings for high speed corners is pretty quick & easy, just maintain speed through a sweeping corner and see if the car oversteers or understeers. You can adjust springs & ARBs as well, and this is more effective for slow speed corners ~~but keep in mind that it will change the car's handling on corner entry and exit in addition to the mid-corner behavior~~ [aero also effects entry & exit, you can't completely separate any of them other than maybe the shocks]. Finish your fine-tuning adjustments using the rides heights.

Corner-Exit

Major Adjustments: Rear springs, Rear ARB

Minor Adjustments: Rear Bumps, Front Rebounds, Front Springs, Front ARB, Rear Toe

Corner-exit happens right after the corner's apex when you are squeezing back onto the gas. The weight of the car shifts strongly from middle to back placing far more load on the rear tires and suspension while releasing the load on the front. At the same time, the power being applied to the rears wants to break grip with the road that much faster.

Primary adjustment is the **rear spring** rate. A weaker rear spring will give you more grip, but runs the risk of bottoming both here and in vertical compressions on the track (dips, bottoms of hills, sharp rises). A stronger rear spring will force the rear to lose grip faster.

The **rear ARB** has a significant effect as well. The current "Fast" and "Slow" adjustments refer to the motion ratio of their attachments to the suspension rocker arms, and are equivalent to a Stiff and Soft setting. A firm rear ARB will reduce body roll and load the outside tires quickly. It's very responsive, but can allow the rear tires to break loose too easily. ~~No rear~~ A soft ARB will maintain grip longer, but will be slower-responding ~~(mushy)~~ [hard to get it "mushy" with the current adjustment range].

Rear bumps and **front rebound** work together to control how fast the weight transfers from front to rear. The rear bump controls how fast the rear will accept the weight and the front rebound control how fast the front gives up the weight. Stiff rear bumps and soft front rebounds lead to a very fast weight transfer and oversteer. Soft rear bumps and stiff front rebounds lead to slower weight transfer and understeer.

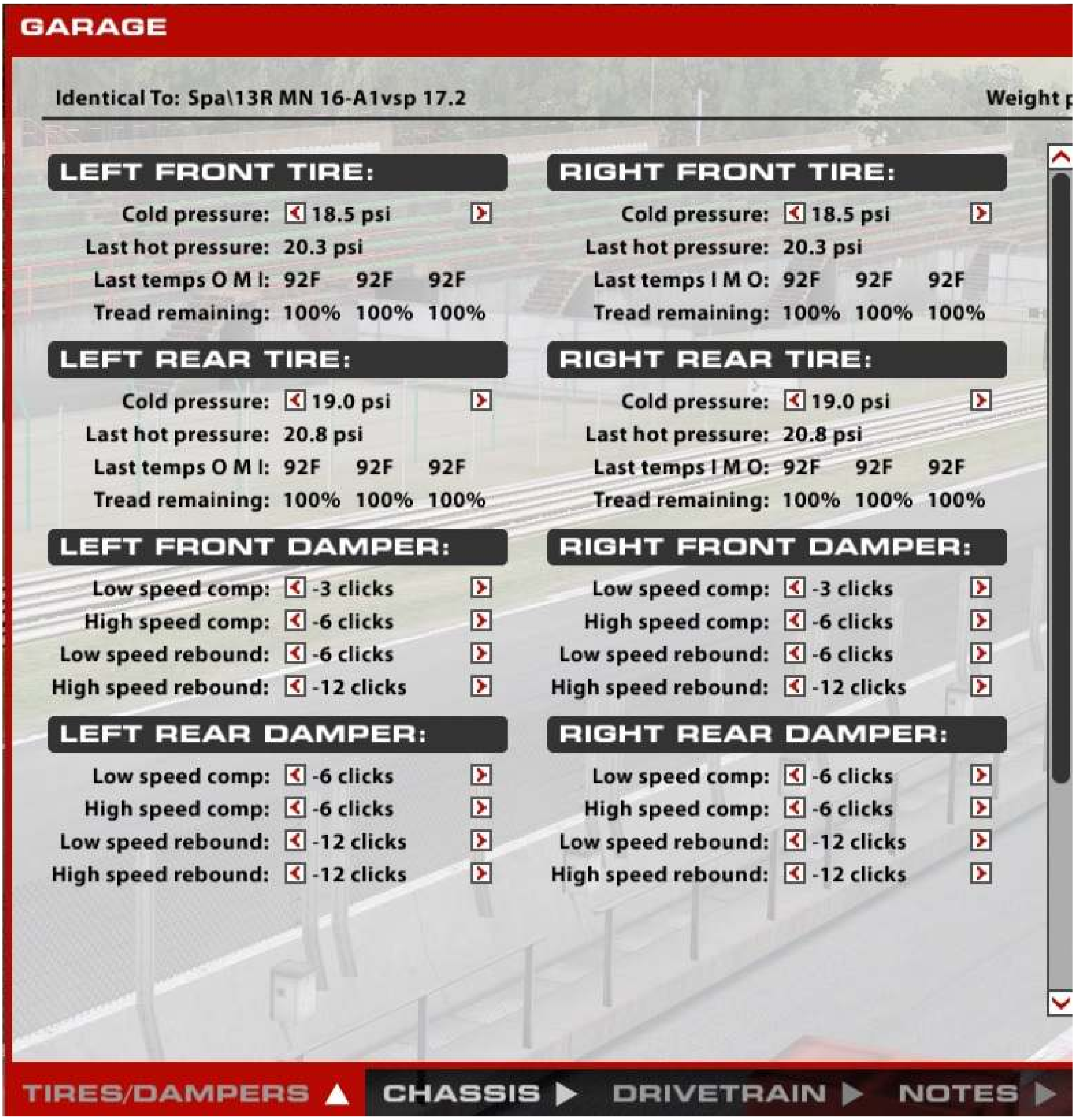
The **front springs** and **front anti-roll bar** are a less important adjustment for the exit phase of cornering because weight transfer has a lot of the load at the rear of the car during this stage. However, they still have an effect, but in an opposite direction to the rear adjustment. So while you would stiffen the rear springs and/or ARB to increase oversteer, at the front you would soften them to do the same thing.

Increasing **rear toe-in** (or going to positive values) will help stabilize the rear of the car during corner exit. The tradeoff can be a loss of straight-line speed and a lack of rotation. Zero toe gives the least rolling resistance and is a good starting point for high speed tracks. ~~A little~~

~~toe goes a long way, don’t go crazy.~~ [lots of toes sometimes works in the sim]

Advice: Rear springs and rear ARB aren't likely to change too much from one set to the next, so once you've found a good baseline setup for the track, concentrate on the fine-tuning with the damper adjustments.

Settings Reference



Tire Pressures

Tire pressures matter a great deal and have a profound effect on the handling of the car. It sounds like it's the most important adjustment, right? The Star Mazda's tires don't seem to vary much from one track to the next, so the same pressures work over and over again. Reduce them 1 click for the race.

Use the tire temperatures from the “tires” settings panel (Inside-Middle-Outside or IMO) to determine if they need more or less pressure. If they are overinflated, the M reading will be ~~much~~ higher than the I and O. If they are under- inflated, the M will be significantly lower than the I reading ~~will be close to each other~~. [updated to the current tire]

Dampers

Front Bump

More front bump stiffness will accept the weight transfer f aster under braking, giving less front grip.

Less front bump stiffness accepts the weight transfer slower under braking, giving more front grip.

Rear Bump

More rear bump stiffness will accept the weight transfer faster under acceleration, giving less rear grip.

Less rear bump stiffness accepts the weight transfer slower under acceleration, giving more rear grip.

Front Rebound

More front rebound stiffness gives up the weight transfer slower under acceleration, giving more rear grip.

Less front rebound stiffness gives up the weight transfer faster under acceleration, giving less rear grip.

Rear Rebound

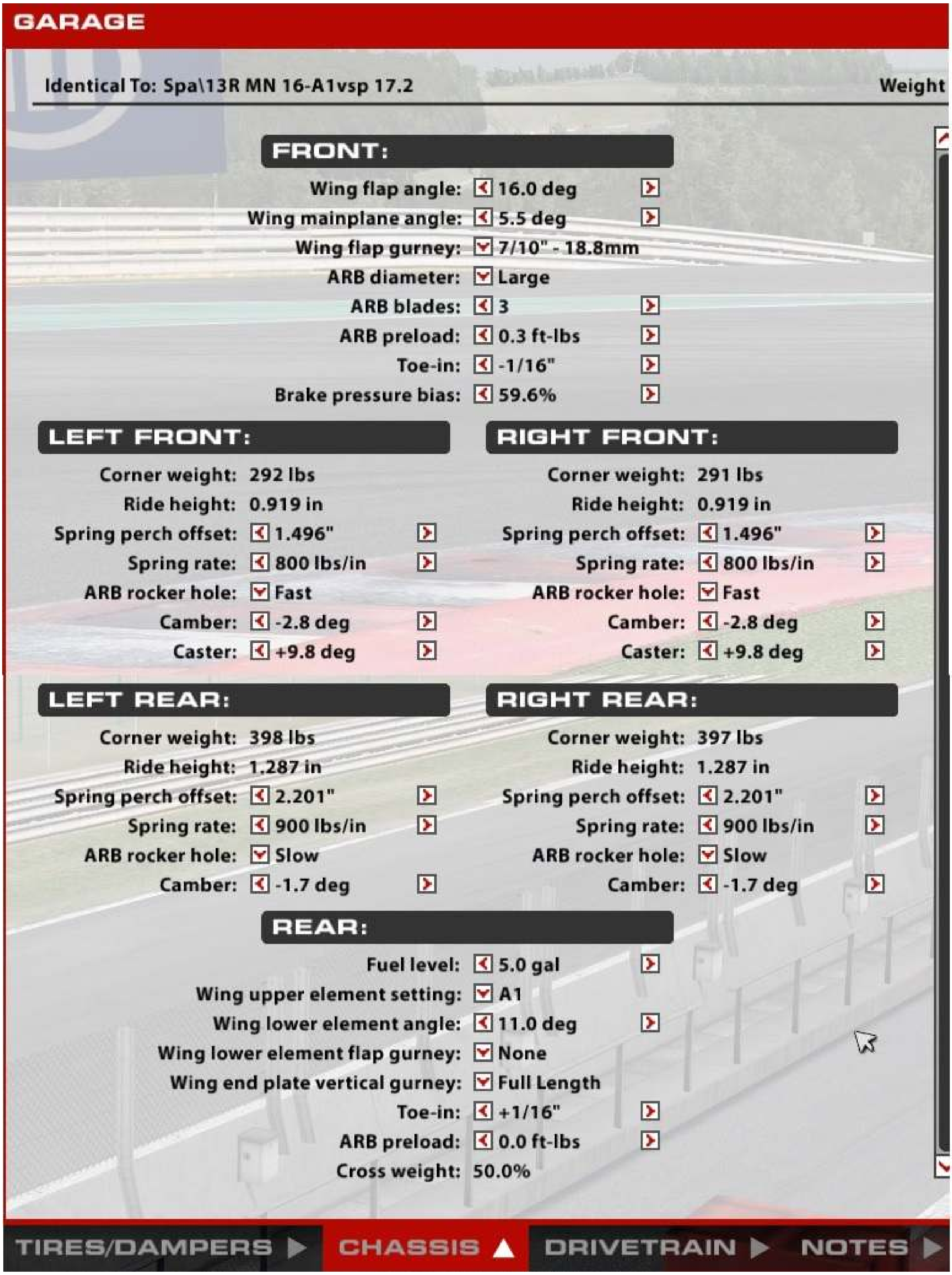
More rear rebound stiffness gives up the weight transfer slower under braking, giving more front grip.

Less rear rebound stiffness gives up the weight transfer faster under braking, giving less front grip.

High speed verses low speed adjustments

The low speed adjustment effects the response to the relatively slow (or slow in terms of the shocks piston speed, NOT the cars speed) movement of the chassis due to cornering, braking, and acceleration.

The high speed adjustment effects the cars response over bumps, in most cases unless the track is unusually bumpy, there is not a lot of performance to be gained adjusting this from track to track.


GARAGE
Identical To: Spa\13R MN 16-A1vsp 17.2
Weight
FRONT:
Wing flap angle: 16.0 deg
Wing mainplane angle: 5.5 deg
Wing flap gurney: 7/10" - 18.8mm
ARB diameter: Large
ARB blades: 3
ARB preload: 0.3 ft-lbs
Toe-in: -1/16"
Brake pressure bias: 59.6%
LEFT FRONT:
Corner weight: 292 lbs
Ride height: 0.919 in
Spring perch offset: 1.496"
Spring rate: 800 lbs/in
ARB rocker hole: Fast
Camber: -2.8 deg
Caster: +9.8 deg
RIGHT FRONT:
Corner weight: 291 lbs
Ride height: 0.919 in
Spring perch offset: 1.496"
Spring rate: 800 lbs/in
ARB rocker hole: Fast
Camber: -2.8 deg
Caster: +9.8 deg
LEFT REAR:
Corner weight: 398 lbs
Ride height: 1.287 in
Spring perch offset: 2.201"
Spring rate: 900 lbs/in
ARB rocker hole: Slow
Camber: -1.7 deg
RIGHT REAR:
Corner weight: 397 lbs
Ride height: 1.287 in
Spring perch offset: 2.201"
Spring rate: 900 lbs/in
ARB rocker hole: Slow
Camber: -1.7 deg
REAR:
Fuel level: 5.0 gal
Wing upper element setting: A1
Wing lower element angle: 11.0 deg
Wing lower element flap gurney: None
Wing end plate vertical gurney: Full Length
Toe-in: +1/16"
ARB preload: 0.0 ft-lbs
Cross weight: 50.0%
TIRES/DAMPERS
CHASSIS
DRIVETRAIN
NOTES

Wings

Wings have a significant effect at many key points – straightaway speed, mid-corner handling, braking from high speed as well as higher speed corner entry and corner exit.

You can currently adjust the angle of the main wings, the flaps, and the height of the Gurney flaps (or wickerbills) both front and rear. With the flaps having the most impact (the main wing is not adjustable on the real car). In all cases increasing the setting leads to more downforce at the expense of increased drag.

Approaches to setups vary, but I tend to set the wings very early in the setup development process and make only minor after that. Many others prefer leaving the wing adjustments until later in the process and that is certainly up to you.

Anti-Roll Bars (ARBs)

Use a firmer ARBs for faster, more direct steering response. The penalty is earlier loss of grip and higher tire temperatures.

Use a softer ARBs for more overall grip but less immediate steering response.

The front ARB stiffness can be adjusted via the diameter (larger is stiffer), the blade angle (a higher number is stiffer, this is cockpit adjustable on the real car), and the ARB rocker hole which changes the motion ratio of the bar ("Fast" = stiffer, "Slow" = softer). At the rear, the ARB rocker is the only adjustment.

Most common settings for the ARBs are stiff front and soft rear.

For road course work, you want the ARB preloads to be close to zero. But with a non-symmetrical oval setup, it might be useful to experiment with various levels of preload.

Toe-In

Negative front toe-in (toe-out) is common, especially on shorter high-downforce tracks. As the car is turning , the outside front has most of the weight and the inside tire is turned slightly more, helping the car to turn better. Too much front toe-out will scrub straightaway speed and cause the car to wander on straights.

Zero front toe-in is common on low-downforce tracks and ovals. Positive front toe-in is very stable, but doesn't turn well and is rarely used~~, if ever~~.

Positive rear toe-in really helps correct exit oversteer. As the car is leaning hard to the outside and you apply throttle, the slight inward direction of the outside rear tire helps keep the back end from breaking loose. Too much rear toe-in will scrub straightaway speed.

Zero rear toe-in is common on low-downforce tracks and ovals. Negative rear toe-in (toe-out) really makes the car turn on acceleration, normally too much. It is very rarely used~~, if ever~~.

Note that in a few cases, extreme or odd ball toe settings have worked well in the sim. So it appears that the car model is not overly sensitive to the negative effects of toe. So don't be afraid to experiment with values that seem wrong from a real world perspective.

Front Brake Bias

Having the right brake bias allows you to get maximum braking performance from the car, while at the same time avoiding most of the bad side effects of locking either end of the car too soon.

More front brake bias means the front tires will lose grip first and the car will tend to understeer. Too much front brake bias means you will wear your front tires out in a hurry and the car will not want to turn under braking.

Less front brake bias means the rear tires will lose grip first and the car will tend to oversteer. Too little front brake bias will cause the rear tires to lock up too fast, and you'll snap-spin the car when you start your turn-in.

Spring perch offsets [changed from Pushrod Length] (Ride Heights)

The spring perch offset setting is measured by length, but it's effect is directly related to ride height, so rather than worry about the spring perch offset itself, only pay attention to the ride height, which is the parameter that really matters.

Ride height works together with wings to determine straightaway speed and mid-corner behavior. Use wings to get close to the desired handling, then ride heights to fine- tune it.

Ride heights will change somewhat as the spring rates are changed, so keep an eye on that. In general, lower ride heights provide better grip, and the front to rear balance is also effected by the chassis rake from front to back. Raising one end tends to reduce the mechanical grip at that end (but can increase the aero grip, making things complicated). Also be aware that the dynamic ride height changes with speed & load, so keep that in mind when selecting spring rates. The Star Mazda has a rear weight bias, and produces more rear downforce (to help stick the heavier rear end), so a setup with stiff front springs and soft rear ones can cause the chassis to squat and behave oddly at higher speeds.

Maximum grip seems to be attained with the front ~~very~~ low (~~.500 in / 13 mm~~ [old values] around 1.0 in / 25mm ~~or less~~) and the rear ~~quite~~ a bit higher (~~.600 in or 15 mm~~ [old values] around 1.3 in / 30mm).

Maximum speed is attained with ride heights being almost equal.

Note that adjusting the suspension Pushrod lengths is the primary way to adjust ride height on a real Star Mazda.

Springs

In general, you want to run as soft a spring rate as will keep the car near its optimum ride height while providing adequate control of dive, squat, roll, and camber change.
For road racing, you generally want the right side and left side settings to be symmetric so the car behaves similarly in left hand and right hand corners.

Stronger springs will give faster, more precise steering input, but will cause the tires to lose grip faster and heat up the tires. Also be aware that higher downforce settings (or faster tracks) often require stiffer springs to resist the increased loadings and prevent bottoming the car.

Weaker springs will hold grip longer but can make the handling somewhat indistinct.

One common question is, why do racecars have stiff springs if to increase grip at the front or rear I soften that end? E.g. if softer =more grip, then why aren't race cars softly sprung? This is a complicated issue which helps illustrate why setting up a car is still a bit of an art. Softer springs generally allow a tire to better follow the pavement (especially when bumps are involved) which provides more grip. In addition, the spring rate affects the relative loading on the tires. A tire has more grip with increased load, but the grip increases at a lower rate than the load, so if the load across all 4 tires is not equal, the tires with more relative load (or stiffer springs) will have relatively less grip than the others (this is also the reason that light cars handle better than heavy ones). Thus if you soften one end of the car, it has more grip and changes the understeer or oversteer balance of the car. Stiffer springs result in reduced suspension travel that reduces the amount of camber change seen by the tire; this allows the tire to spend more time at or near its optimum camber with increases grip. The reduced travel also helps maintain an optimum ride height for the cars aero, which also increases grip. Because of the conflicting factors, sometimes the normal guidelines don't work, which is why testing is still required (and why you want to test changes one at a time).

Camber

This is another setting that doesn't need to change very often, but does have a significant effect on overall grip. When the car is turning hard, much of the weight shifts to the outside tires and the car leans a little to the outside. At that point, you want enough camber so that the maximum amount of rubber is touching the pavement.

To determine the right setting, drive the car for enough laps to scrub them in and bring them fully up to temperature (I like to run them for 5 laps or so, or until I run out of fuel starting with the 2 gallon minimum fuel load) ~~wear the tires to about 95%.~~ The textbook, or real world approach is then to adjust them until you get an even temperature spread across the tires, with the inside readings being the hottest, and the outer edges being the coolest. Unfortunately, with the current car & tire model this doesn't work. For the current optimum, it seems you want the inner and middle readings to be about the same, with the outer reading to be significantly cooler. Some people also like to use tire wear rather than temperature as their indicator of choice, with the inner wear being the same or slightly higher than the middle and the outer edge having substantially less wear. ~~The wear should be most in the middle, a little less in the inside and significantly less on the outside. Unfortunately, the temperatures shown on the tires screen are not very helpful anymore (as of the adoption of the new tire model on the Star Mazda), so wear is your best indicator.~~

Caster

Caster is the longitudinal angle of the front upright supports. ~~Typically, most passenger cars have nearly vertical uprights or zero caster~~ [not true, most are in the 5-7 degree range]. The front wheel of Peter Fonda's motorcycle from "Easy Rider" is an example of extreme caster.

Caster is not so much a performance adjustment as it is a "feel" adjustment. The more caster you have, the more force ~~feedback you will get from~~ required to turn the steering wheel. The setting is adjustable from ~~zero~~ around 6 to ~~9~~ 10 degrees, and most commonly is left at or near the maximum. High camber settings in theory provides some beneficial extra camber gain when cornering, but it also increases weight jacking and can interfere with or obscure the feel of small changes in the grip.

For oval use, using less caster on the inside wheel and more caster on the outside wheel makes the car "want" to turn in the desired direction and provides a performance advantage. For road course use, such a self-steering tendency should be avoided by using the same setting on both the left & right side.

Cross weight

Cross weight is a comparison of the diagonal weight distribution across the car. For road racing, or when you want the car to behave the same in both left hand and right hand corners, you want to maintain a balanced cross weight of 50%. For oval racing however, changing the cross weight can provide additional grip when turning in only one direction.

Gearing

Given the limited gear options under the spec rules, and the current aero model the above gears are close to optimal for most tracks (some people prefer a slightly shorter, 20/25 5th gear). While there may be a couple of tracks on the schedule where the typical top speed is under 138 mph, and thus could benefit from shorter gearing, catching a good draft will typically push you over that value. In addition, the alternate ratios available for 3rd & 4th don't provide very good gear spacing for anything other than the 20/25 or 18/22 5th gear, which forces you to choose from using a poorly spaced 6 gears or a well spaced 5 gears (which is normally better).

Gear Ratio Options

Ratio	Ratio - Num	Location
12/29	**2.417**	**1st**
15/32	2.133	2nd
15/30	**2.000**	**2nd**
17/30	1.765	2nd
16/30	1.875	3rd - 6th
15/25	**1.667**	**3rd - 6th**
19/27	**1.421**	**3rd - 6th**
20/25	**1.250**	**3rd - 6th**
18/22	**1.222**	**4th - 6th**
19/21	**1.105**	**5th - 6th**
24/26	1.083	6th
24/24	1.000	6th

Troubleshooting Guide

Too Slow On Straightaways

- Lower both front and rear wings
- Make the front and rear ride height the same

Hitting the Rev Limiter On Straightaways

- Switch to taller gears

Back End "Swims" Under Hard Braking

- Move brake bias toward the front

Front Brakes Lock Up Under Hard Braking

- Move brake bias towards the rear

Damn Thing Won't Turn-In (major understeer)

- Move the brake bias towards the rear [changed the order, most likely fixes first]
- Use a softer front ARB or firmer rear ARB
- Use a softer front spring or stiffer rear spring
- Raise rear tire pressure or reduce front tire pressure

Won't Turn-In Quickly Enough (minor understeer)

- Reduce the front bumps or increase the rear rebounds
- Decrease front toe-in (increase toe-out)

Back End Slips A Little on Turn-In (minor oversteer)

- Increase the front bumps or decrease the rear rebounds
- Increase front toe-in

Snap-Spins On Turn-In (major oversteer)

- Move the brake bias towards the front [changed the order, most likely fixes first]
- Use a firmer front ARB or softer rear ARB
- Use a stiffer front spring or softer rear spring
- Reduce rear tire pressure or increase front tire pressure

Will Not Turn in Mid-Corner (major understeer)

- Increase front wing or decrease rear wing

- Use a stiffer rear spring or softer front spring
- Use a firmer rear ARB or softer front ARB

Front Tires Push in Mid-Corner (minor understeer)

- Decrease rear wing or increase front wing
- Decrease front ride height or increase rear ride height

Back-End Starts to Slide in Mid-Corner (minor oversteer)

- Increase rear wing or decrease front wing
- Increase front ride height or decrease rear ride height

Spins in Mid-Corner (major oversteer)

- Increase rear wing or decrease front wing
- Use a stiffer front spring or softer rear spring
- Use a firmer front ARB or softer rear ARB

Plows straight ahead on Corner Exit Throttle-On (major understeer)

- Softer front springs / stiffer rear springs
- Softer front ARB / stiffer front ARB

Understeering on Corner Exit Throttle-On (minor understeer)

- Decrease front rebounds or increase rear bumps
- Increase rear toe-in (more positive toe)

Oversteering on Corner Exit Throttle-On (minor oversteer)

- Increase front rebounds or decrease rear bumps
- Decrease rear toe-in (less negative toe)

Spins on Corner Exit Throttle-On (major oversteer)

- Softer rear springs / stiffer front springs
- Softer rear ARB / stiffer front ARB

Star Mazda Setup Sheet

Use the following sheet to track you changes and record performance for each setup you create. Many thanks to Erik Roy for his kind permission to include this as part of the guide!

STAR MAZDA SETUP SHEET

TRACK : _
SEASON : _
DATE : _
SESSION : _
WEATHER : _
RESULTS : _
FUEL : _ G
FUEL CONS : _ /laps

WING SETTING__ °
ANTI-ROLL BAR_
TOE-IN_ in
FRONT BRAKE BIAS__ %

BEST LAP_ :
OVERALL_ :
S1_ :_
S2_ :_
S3_ :_
S4_ :_
S5_ :_
S6_ :_
S7_ :_
S8_ :_

LEFT FRONT

COLD PRESSURE psi
LAST HOT PRESSURE psi
LAST TEMPS O M I
TREAD REMAINING

CORNER WEIGHT_ lbs
RIDE HEIGHT_ in
PUSHROD LENGTH_ in
SPRING RATE_ lbs/in
BUMP STIFFNESS__ clicks
REBOUND STIFFNESS__ clicks
CAMBER_ °
CASTER_ °

RIGHT FRONT

_ psi COLD PRESSURE
_ psi LAST HOT PRESSURE
_ LAST TEMPS I M O
_ TREAD REMAINING

_ lbs CORNER WEIGHT
_ in RIDE HEIGHT
_ in PUSHROD LENGTH
_ lbs/in SPRING RATE
_ clicks BUMP STIFFNESS
_ clicks REBOUND STIFFNESS
_ ° CAMBER
_ ° CASTER

LEFT REAR

COLD PRESSURE_ psi
LAST HOT PRESSURE_ psi
LAST TEMPS O M I _
TREAD REMAINING _

CORNER WEIGHT lbs
RIDE HEIGHT in
PUSHROD LENGTH in
SPRING RATE_ lbs/in
BUMP STIFFNESS__ clicks
REBOUND STIFFNESS__ clicks
CAMBER_ °

RIGHT REAR

_ psi COLD PRESSURE
_ psi LAST HOT PRESSURE
LAST TEMPS I M O
TREAD REMAINING

_ lbs CORNER WEIGHT
_ in RIDE HEIGHT
_ in PUSHROD LENGTH
_ lbs/in SPRING RATE
_ clicks BUMP STIFFNESS
_ clicks REBOUND STIFFNESS
_ ° CAMBER

WING SETTING__ °
ANTI-ROLL BAR_
TOE-IN_ in
CROSS WEIGHT %
GEAR SET

erikroy57@hotmail.com v1.1

Actual Star Racecars Recommended Baseline Setup

PRO MAZDA RACECAR CHASSIS BUILD SHEET

		TRACK	Sebring		TRACK LENGTH	3.70	Miles
DATE	27-Jan-09	CHASSIS	Star Pro Mazda		Sheet Version	1	
EVENT	Open Test	CHASSIS #			SESSION:	Session 1	
DRIVER		ENGINE#		SETUP FUEL: 10	SESSION FUEL:	10	

FRONT AERO

Front Wing Main Angle	std.				Part #
Front Wing Flap Angle	23.0	Footplate		FWEP Gurney	n/a
Front Wing Flap Gurney	3/4	Forward	0	FWEP Footplate	n/a
Front Wing Middle Gurney	0	Trailing	0	Footplate Skid	n/a

SPRINGS		CAMBERS		AVG.	RIDE HEIGHT		TOE				CASTER		
900	900	-3.50	-3.50	27.0	27.0	27.0	in	2mm	2mm	in	8.0	8.0	
700	700	-2.90	-2.90		37.0		in	1mm	1mm	in	8.0	8.0	on arm
			RAKE	10.0	TILT	0.0							

Cold psi		Hot psi	
17.0	17.0	21.0	21.0
17.0	17.0	20.0	20.0

CORNER WEIGHTS		SETUP WEIGHTS LF WEIGHT	% CROSS	Anti-Roll Bars	Bar / Blades		Connected?	Adj.		Tire Codes	
297	297	0	50.00%	Front	19mm	STD.	CONNECTED	3		430	430
395	395	42.92%	1384	Rear	0.625	0.625	CONNECTED	0.75	From Top	430	430
		% FR. WEIGHT	TOTAL								

GEOMETRY

			Left	Right		Left	Right		
Front Rocker Main	STD.	Front Lower Fore	23.437	23.437	Rear Lower Fore	22.875	22.875	Steering pinion	9 teeth
Front ARB Rocker	STIFF	Front Lower Aft	26.625	26.625	Rear Lower Aft	22.375	22.375	Front Roll Center	STD.
Rear Rocker Main	STD.	Front Upper Fore	18.875	18.875	Rear Upper Fore	15.968	15.968	Rear Roll Center	UPPER
Rear ARB Rocker	SOFT	Front Upper Aft	24.781	24.781	Rear Upper Aft	n/a	n/a		

DAMPERS

Damper Specifications		Press	Comp. Valve	Reb. Valve	Bump Rubber	Packer	Gap-On Pad	Compression LS	Compression HS	Rebound LS	Rebound HS	Compression LS	Compression HS	Rebound LS	Rebound HS
Fr. ID	Ohlins TTX36-SPEC	75	X	X	0.000	######	2.000	-15		-15		-15		-15	
Rear ID	Ohlins TTX36-SPEC	75	X	X	0.000	######	2.000	-15		-15		-15		-15	

Extended Length		Pad Length		Static Droop		Est. Preload		Maximum Travel		Air Gap-Extended	
11.02	11.02	10.820	10.820	0.200	0.200			2.047	2.047		
11.42	11.42	11.120	11.120	0.300	0.300			2.047	2.047		

BRAKES

Brake Bias at 500 psi		Master Cyl.	Rotors	Calipers	Pads	Fluid
53%	Front	0.75	PFC	PFC	05	Motul 600
	Rear	0.812	PFC	PFC	05	

REAR AERO

				Cooling Blanking		
Upper Rear Wing Angle	STD.	Lower Rear Wing Angle	STD.	Left Side	0	inches closed
Upper Rear Wing Flap Angle	32.0	Lower Rear Wing Gurney	3/4	Right Side	0	inches closed

Gear Stack			Max RPM	8600
			Speed	RPM Drop
Final	9	31		
6th	19	21	152.3	996
5th	20	25	134.7	1035
4th	19	27	118.4	1267
3rd	16	25	101.0	1433
2nd	16	30	84.2	1483
1st	12	29	69.6	

Differential Settings		
Drive Ramp	n/a	DEG.
Coast Ramp	n/a	DEG.
Clutch Faces Active	0	faces
Preload Spring	none	
Assembled Preload	0	ft*lbs

Notes:

Amb.	Track